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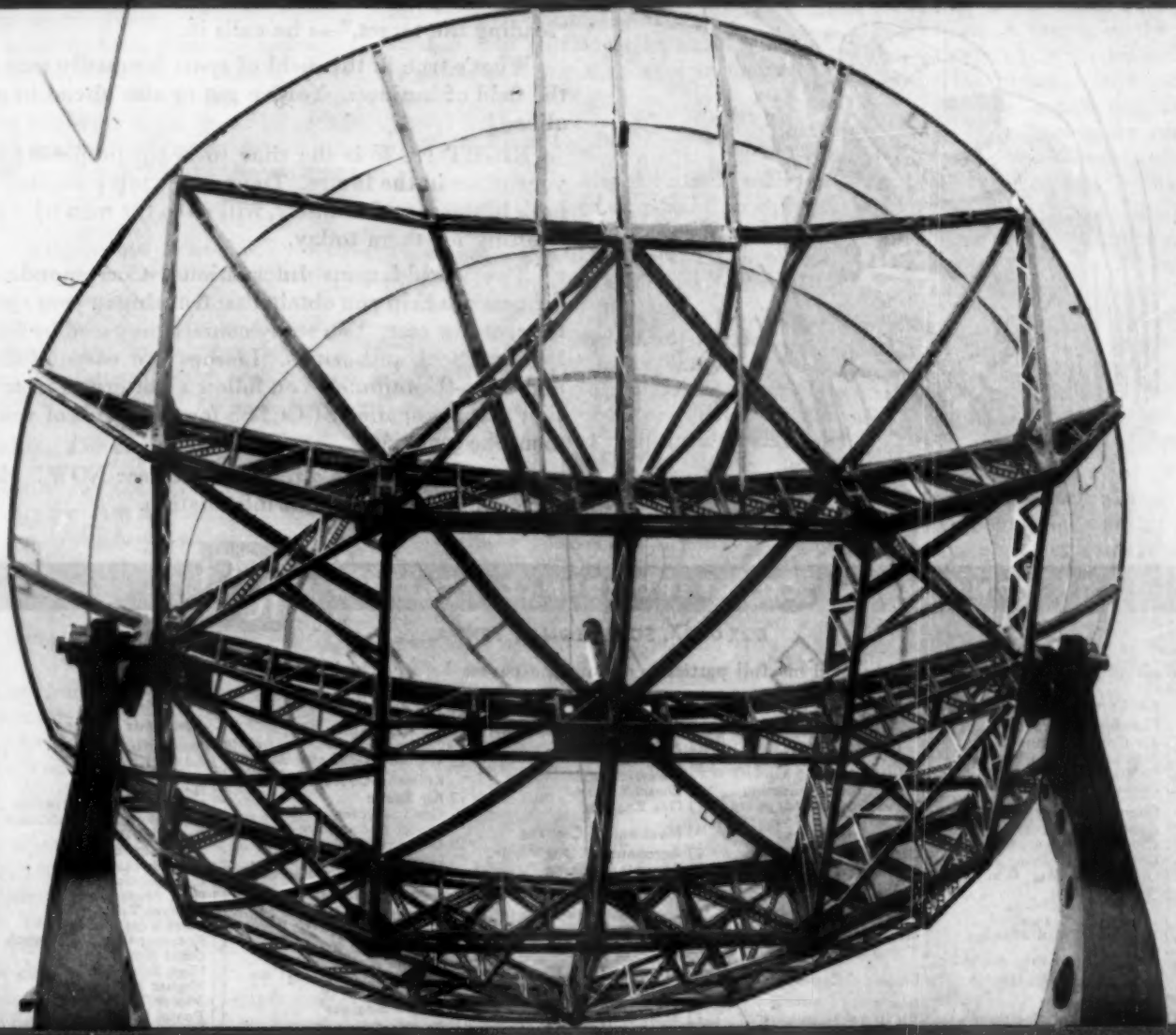

Radar Mirror

See Page 25

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BOTANY-AAAS

First Photosynthesis Step

Mysterious "Factor B", first material made by plants using sunlight, may hold the key to the artificial manufacture of food in the future.

➤ THE discovery of the first material that is manufactured by the living plant through the energy of the sunlight has been made.

This may be to the artificial manufacture of food of the future what discovery of the fission of uranium was to the atomic bomb.

A scientific team from the University of Chicago, Drs. Hans Gaffron, A. H. Brown and E. W. Fager, has determined just what is the primary product that is made out of carbon dioxide and water, energized by the light acting through chlorophyll, the green stuff of the plant.

It is a mysterious "Factor B," unidentifiable as any known chemical. Hidden in the composition of this unknown substance may be the key to duplicating the year round in factories what the farms and forests of the world work at only in the summer growing season.

Promising Development

Scientists of the American Association for the Advancement of Science, who spent two days on discussions of photosynthesis, as this process of sugar and starch manufacture in the living plant is called, rate this factor B as the most promising development so far made.

Tagged atoms of carbon, a byproduct of atomic bomb research, were used to track down just what is made out of the carbon dioxide, one of the waste gases of the air that every animal breathes out. In the experiments, a slimy green alga named scenedesmus was put in contact with carbon dioxide, all of the carbon atoms of which were artificially radioactive "carbon 14." Wherever this isotope or variety of carbon travels can be told by the clicks that its exploding atoms cause in a Geiger counter. The carbon dioxide raw material can be traced to any part of the growing plant by this method.

The Chicago scientists found that it takes only a very few seconds for the green algae to snatch up some of the tagged carbon dioxide and convert it by means of the light energy into the new mysterious factor B.

They used hundreds of quarts of the algae in getting enough of this first product of photosynthesis to analyze in various ways. All manner of tests failed to identify it. They know it is not sugar starch, a protein-like substance or the common organic acids. The one thing they do know is that it acts more like an acid than anything else, although it is much less active than most such substances.

Used by Plant for Building

The plant uses factor B material with great rapidity and ease to build up the many complex parts of the living plant. This is shown in other experiments by the speedy spread of the tagged carbon atoms to all parts of the plant.

The search for the secret of photosynthesis is getting hotter. Large vats of the convenient green algae are being grown at the University of Chicago to give more material on which to experiment.

At the University of California, radioactive carbon is being used in working with another simple green plant, the alga called chlorella. At Antioch College in Ohio, scientists are trying to discover the way chlorophyll is put together chemically, which may lead to reproducing or bettering the substance that captures light energy and puts it to work.

Scientists do not dare guess how long it will be before an artificial green plant can be built or whether a chemical process can be achieved to convert sunshine economically into sugar and starch for food or factory material. But that is the practical goal for these tedious experiments with the simplest of growing plants.

Upon these researches may depend whether the world continues to be hungry as future decades bring hundreds of millions more people to the earth. The scientists doing the work, unlike those who made the atomic bomb, have easy consciences as to what the future will bring forth. For they do not see how their discoveries can be fashioned into weapons for destruction.

Stories from the meeting in Chicago of the American Association for the Advancement of Science are designated by AAAS in the line above the head. For other reports from the conference see SNL, Jan. 3.

GENERAL SCIENCE-AAAS

AAAS Prize Awarded for Paper on Earth's Origin

➤ THE thousand-dollar prize of the American Association for the Advancement of Science was awarded to 30-year-old Dr. Harrison S. Brown, of the University of Chicago's Institute for Nuclear Studies, for his paper on elements in meteorites and the earth's origin. Dr. Brown is the youngest scientist ever to receive this prize, which was given for the 21st time at the meeting in Chicago.

The research which was the subject of Dr. Brown's prize-winning paper is expected to become the basis of further studies which may lead to a closer estimate of the age of the earth and of the known universe. Since the age of the cosmos is now variously estimated at from three to ten billion years there is plenty of room for closing the bracket.

Interviewed after receiving the prize, Dr. Brown mentioned that one of his colleagues has recently succeeded in isolating a few milligrams of lead from an iron meteorite. Since lead is the final

***PRESIDENT-ELECT** — Dr. Elvin Charles Stakman of University Farm, St. Paul, Minn., will head the AAAS in 1949.*

stage in the radioactive decay of uranium, this accomplishment should materially aid in the determination of the age of meteorites, and hence of other material in the universe, as soon as the uranium content of the original sample has been ascertained.

Dr. Brown, who was assistant director of the chemistry division at Oak Ridge during the war, stated that the techniques for separation of chemical isotopes developed as part of the work on atom-bomb production will be highly useful in his researches from here on.

In a book, "Must Destruction Be Our Destiny?" which was published shortly after the atom-bombings of Hiroshima and Nagasaki, Dr. Brown was one of the first to raise the disturbing questions of the relation of atomic energy to world peace that are still being debated in world forums.

Science News Letter, January 10, 1948

ZOOLOGY-AAAS

Killer Trait in Animals

This inherited deadliness to other strains of the same species was discovered in microscopic animals and traced to their possession of the factor Kappa.

➤ PEACEFUL, unaggressive citizens of the microscopic world within a drop of water can be transformed into killers by giving them access to the weapons of slain aggressors of their own species. Not only that, but they can also hand down this acquired killer trait to their descendants.

This sinister situation among invisible animals, which might well be a parable for present times in our more magnified cosmos, is a new discovery by Prof. T. M. Sonneborn of Indiana University, whose earlier work on peculiarly inherited deadliness in the so-called slipper animalcule, paramecium, won him the $1,000 prize of the American Association for the Advancement of Science a year ago. It was disclosed in a discussion with a group of other zoologists who have been working on the same minute animals.

Strain Deadly to Own Species

Among slipper animalcules there are strains whose mere presence is deadly to other strains of the same species. This lethal action is due to their possession of a factor called Kappa, or K (for killer). This killer factor is handed down through the generations in the general protoplasm of the cell, not by means of genes in the chromosomes of its nucleus.

Prof. Sonneborn took large numbers of such K-equipped micro-organisms and made a kind of mash of them by squirting them very forcibly through a hollow needle against a plate; into this debris of dead killer-animals he introduced small numbers of non-killers, each in its own individual kit of this witch-brew. They picked up the killer factor and made it part of themselves, and thereafter they and their descendants were killers.

Each Carries Killer Factor

In the same discussion, Dr. John R. Preer of the University of Pennsylvania stated that each killer individual carries an armament of between 200 and 800 particles of the killer factor. If a suitably disposed paramecium possesses even a single particle, this particle can multiply itself up to the number necessary to make its owner a killer. Dr. Preer has also measured the size of the deadly particles by means of X-rays. He found that they are larger than genes, more nearly the size of larger filterable virus particles. Dr. Mary L. Austin of Wellesley College added her contribution: a killer individual, to keep the neighborhood unsafe for its fellows, needs to release only one particle of its deadly substance every five hours. One particle is enough to kill an unaggressive neighbor.

Snapping Shrimp Studied

➤ DARWINIAN competition for survival goes on not only among the individual animals but among individual cells in the tissues of the same animal, Dr. Hugh H. Darby of the Carnegie Institution of Washington pointed out. He has demonstrated this in experiments in the re-growth of pieces of claw clipped off the snapping shrimp of gulf waters.

When the shrimp next shed its shell and grew a new one, the replacement-growth on the partially amputated claw was not as large as it would have been under normal conditions. On the other hand, the other end of the claw, which should have merely remained the same size, became larger. Dr. Darby interprets this as indicating a competition for growth material between the two parts of the same claw.

The snapping shrimp, incidentally, has been in the news already. During the war, the underwater noise made by millions of them snapping their claws together fouled up very badly some of the Navy's sound detectors used in tracking submarines.

Science News Letter, January 10, 1948

Corn is Mexico's most important crop.

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CHEMISTRY-AAAS

Plastic Coats for Eggs

New chemical discoveries also include sulfa drug for animals, flame-resistant paints, fortified margarine with a longer-lasting vitamin A content.

➤ WITH a jingle of chemical formulae, Santa in the guise of chemists is still around, delivering the following new scientific things to the world:

Plastic coats for eggs that will keep them fresh outside a refrigerator for a year.

A new sulfa drug for animals that ought to save a couple of hundred millions of dollars annually down on the farm.

Flame-resistant paints for inside walls that don't need inflammable solvents to carry the new mode synthetic protecting film.

Fortified margarine with a longer-lasting vitamin A content.

A better phosphorus-containing substitute for nicotine (for killing insects, not smoking) that slays bugs that defy DDT.

A new complex liquid, christened DABP, that among other things can bind cloth of glass into a strong, semi-transparent "sandwich."

And a way of using the "drip" from frozen foods, the gooey stuff that comes out of the frozen edibles, to tell just how it is getting along in storage—"almost as important as the information obtained from an examination of human blood" says the scientist.

These new chemical developments were announced to the joint meeting of the American Association for the Advancement of Science and the American Chemical Society.

Dr. Gustav Egloff of the Universal Oil Products Co. told of the plastic film for eggs and the sulfamethazine that promises to control mastitis in cows, shipping fever in horses and some chicken diseases.

L. E. Ludwig of Montgomery Ward Paint Works told of the new paint made of vinyl polymers in water dispersions. A. I. Coombes of Wilson & Co., Chicago, told of the cheaper and long-lasting method of enriching margarine. Prof. L. F. Audrieth and Dr. O. F. Hill of the University of Illinois made atomic geometry studies to pep up the German-born insecticide, HEPT, or hexaethyl tetraphosphate to chemists.

Arthur D. F. Toy, Lee V. Brown of Victor Chemical Works, Chicago, discovered the plastic, diallyl benzenephosphonate. Prof. Socrates Kaloyereas of Louisiana State University studied the drip.

Science News Letter, January 10, 1948

AERONAUTICS-AAAS

Airplane Engines Designed By Novel Mothball Method

➤ A NOVEL mothball method helps scientists design lighter and more efficient airplane engines, the American Chemical Society, meeting in Chicago, was told by Prof. Charles C. Winding and A. J. Cheney, Jr., of Cornell University. The mothball material is used in radiator construction to test heat effects.

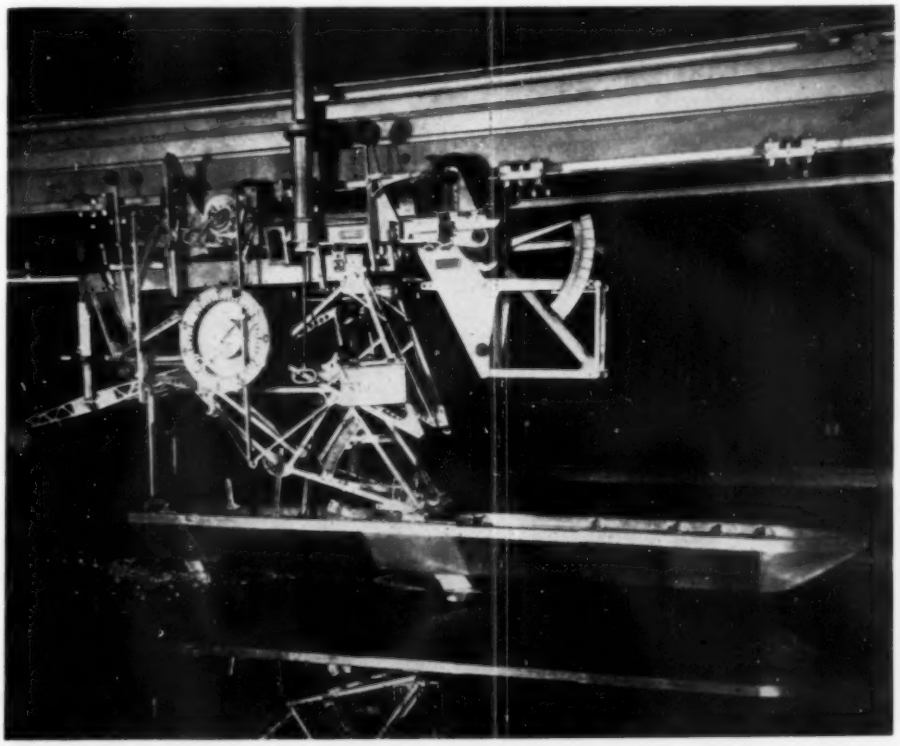
The new and simple technique for testing designs utilizes models of radiators cast in naphthalene, the white substance of which mothballs are made, they said. Air blown over this chemical causes it to evaporate. By noting the rate of evaporation at different points on the model, engineers can estimate accurately the cooling efficiency of the design.

The conventional method is to cast the radiator in metal and measure its cooling in actual operation. This is a costly and lengthy procedure. The novel mothball method requires the fabrication of simple plaster of Paris molds in place of metal parts. The necessary evaporation measurements are made with one small instrument called a micrometer instead of the elaborate equipment needed to measure heat absorption in metal parts.

This new technique may find many applications in the design of other industrial equipment. Air-cooling plays an important part in air-conditioning and refrigeration, for example. The new method is suitable for design use in these industries.

Science News Letter, January 10, 1948

Sponges were among the earliest forms of life on earth.



HYDROFOILS—Wing-like projections under a speed boat permit greater speeds because they lift the hull completely out of water. The lift-drag ratio of the foils is higher than that of a conventional semi-planing hull. The picture shows two hydrofoils under a boat and overhead propeller mechanism used in the towing tank at Stevens Institute of Technology.

ENTOMOLOGY-AAAS

DDT Scores More Victories

Black flies, sprayed with the insecticide while in the larvae stage, were completely wiped out in treated brooks. Corn borers also proved vulnerable.

➤ BLACK flies, just about the most tormenting pest in northern latitudes, have at last met their Waterloo—and DDT was the weapon. Dr. Gustave Prevost of the University of Montreal told entomologists at the meeting how he had treated certain brooks in May, 1946, with DDT; in October, 1947, they were still free of the infernal insects. The trick, said Dr. Prevost, is to catch your black flies in their most vulnerable stage, as larvae. There were neither eggs nor the resting pupal stage when he made his attack. He caught them literally with their armor off—and that was that.

Less complete triumph, but some advance at any rate, was scored in DDT attacks on European corn borers in Wisconsin, where they are a serious threat to commercial sweetcorn and hybrid field-corn plantings. Dr. H. J. Lilly of the University of Wisconsin recommended two dustings with 5% DDT, spaced to catch the young borers just after they have hatched and before they can gnaw their way to safety within the tissues of the plants.

Soilless Gardening Pays

➤ SOILLESS gardening by the gravel-bed method proved more economical on a strict cost-accounting basis, in a carnation-growing experiment conducted at Colorado A and M College by August Mussenbrock and George Beach. Two identical greenhouse benches were used, one filled with gravel and irrigated with fertilizer-salt solution, the other filled with soil. The cost of producing a crop of flowers on the soil was 28% higher than that on the gravel bed.

Fertility Not Impaired

➤ LIVING at mountain altitudes has no effect on animals' reproductive ability, despite reports to the contrary from Andean uplands, Prof. Carl R. Moore, University of Chicago zoologist, declared at the meeting.

Prof. Moore had colonies of three kinds of rodents—rats, mice and hamsters—kept at four different elevations: 600 feet, at Chicago; and 7,500, 9,600 and 14,260 feet, respectively, in the Rocky Mountains. At all levels, the animals reproduced freely, and all grew healthily to similar sizes and weights. There were no signs of sterility, and growth to sexual maturity was approximately the same in all four places.

The one sign of abnormality was in female mice at the highest altitude. There they seemed to have less milk for their young, and some of them developed a tendency to devour their own offspring.

Science News Letter, January 10, 1948

PSYCHOLOGY-AAAS

Conflict Induces Crackup

New evidence from rats confirms theory that a nervous breakdown may result from enforced action on impossible problems. Probably applicable to humans.

➤ IF YOU should have a nervous breakdown, you can blame mental conflict. For some individuals, such physical strains as the noise of battle might cause a crackup, but these are few. Many more break when the noise comes on top of a losing struggle with impossible problems.

At least that is the sort of thing that happens with laboratory rats in experiments reported by Drs. Norman R. F. Maier and Joan U. Longhurst, of the University of Michigan. Rats break down when they are forced by an airblast to jump in a direction they have learned is wrong. The air makes a "Shishsh" noise annoying to humans and very irritating to rats.

Dr. Maier's rats were first introduced to scientists at a meeting similar to this one nine years ago. Then, for the first time, scientists saw, in motion pictures, rats going into fits exactly like human epileptic fits or the convulsions produced by the electric-shock treatment used for the mentally ill. In the excited stage of these fits, the rats run around and around as though crazy. In the rigid phase, they can be picked up and held by the tail as if it were a handle. Dr. Maier called this seizure a neurotic pattern. His report of it received the annual $1,000 prize of the AAAS.

At the time, scientists were enthusiastic about it, because of the light it might throw on the causes and ways of preventing nervous breakdown, combat fatigue, and possibly also epilepsy in man.

But considerable disagreement among psychologists followed. Some believed on the basis of further experiments that it was the noise rather than the mental conflict that brought on the fit.

At this meeting Dr. Maier reported new experiments which test this idea and indicate that he was correct in putting the blame on mental conflict which makes even rats crack up.

In his new experiments, he used 81 rats from 18 different litters. One group of 37 animals were first trained to distinguish between a black circle and a white circle and to jump to the black circle to obtain a reward.

Later these same rats were shown only one of the cards, but were forced by a blast of air to jump, regardless of whether the card shown had the black circle or the white one. When the "wrong" circle was shown, the rat did not want to jump but had to. This formed the "conflict."

Another control group went through the same test of having to jump to a card containing either black or white circle, but these animals had had no previous training to teach them that one circle was right and the other wrong. Thus having to jump to the white circle instead of a black one did not disturb them—there was for them no conflict.

The group faced with the mental conflict had a larger number of seizures per animal than those who were subjected to the noisy airblast alone, in the ratio of 1.6 to .44. And more of the group who had to endure the conflict became subject to fits, 38.8% as compared with 6.7%.

Science News Letter, January 10, 1948

MEDICINE-AAAS

Bacitracin Goes on Trial

Tests will be made in nine different cities of the new anti-germ chemical to determine the best way of using the remedy before it goes on sale.

➤ BACITRACIN, one of the new anti-germ chemicals of the penicillin class, is now becoming available in sufficient quantities to get special trials in nine different cities, its discoverers, Dr. Frank L. Meleney and Miss Balbina A. Johnson of Columbia University College of Physicians and Surgeons, revealed.

The trials are carefully planned to show the possibilities and best ways of using the new remedy before it goes on sale generally. At the same time, the U. S. Food and Drug Administration is setting up tentative standards and specifications for potency and safety.

The nine cities selected for the clinical trials of the new drug are: New Orleans, San Antonio, Rochester, Minn., Madison, Wis., Cincinnati, New York, Philadelphia, Baltimore and Charlottesville, Va. They were chosen in order to get a wide variation in climate, temperature, general physical condition of patients and differences in economic level. All these factors, Dr. Meleney explained, can affect the results of treatment.

Favorable results have been obtained in 86% of the 186 cases of surgical infections already treated by local application of bacitracin. These cases ranged from boils and styes to such conditions as cellulitis and chronic osteomyelitis.

Bacitracin is an antibiotic, or anti-germ chemical from a germ, obtained from a strain of Bacillus subtilis found in the tissue removed in cleaning up the wound in a compound fracture case. Because the patient's name was Tracey, the discoverers named the strain of bacillus the Tracey strain and the antibiotic it produced bacitracin.

It was used at first to treat surface infections by local application. It has now been purified so that it can be safely given by injection in cases in which the infection has spread beyond the local area and is involving the body generally.

Develop Many Antibiotics

➤ ANTIBIOTICS, or drugs like penicillin and streptomycin, are being developed at a bewildering rate; yet the future holds challenges that scientists have not yet begun to meet, Prof. Selman A. Waksman of Rutgers University, pioneer in this field, declared. Molds and bacteria that produce only one antibiotic apiece are outdistanced now by species that produce as many as half-a-dozen.

Among the needs that must be met, Prof. Waksman listed antibiotics that will attack filterable viruses, and others that will act against abnormal tissue growths like tumors. It is also desirable to overcome the development of resistance in certain bacteria to the action of antibiotics. Finally, we still need to find out how antibiotics work.

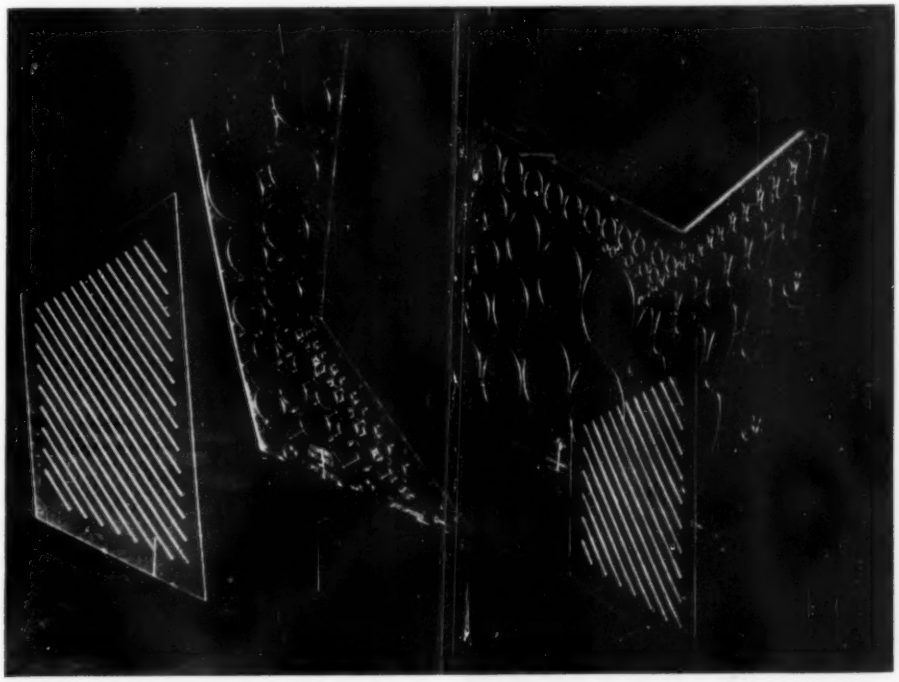
Decay Immunity Factors

➤ SIX factors that make teeth immune, or resistant, to decay were reported by Dr. L. S. Fosdick of Northwestern University Dental School.

These factors are none of them like the blood substances that give immunity, or resistance, to measles. There are probably no anti-decay substances in the blood. They may exist in the saliva, but so far no one has discovered them. But some people have teeth that are immune to decay and others have periods when their teeth do not decay. Prisoners in German and Japanese concentration camps, for example, had caries, or tooth decay, before but not during the time they were in the camps. Reviewing present knowledge of tooth decay, Dr. Fosdick finds the following six factors in decay immunity:

1. A copious or at least moderate flow of saliva.
2. Ability of the saliva to neutralize acid.
3. The concentration of calcium and phosphorus in the saliva.
4. The anatomy of the mouth and teeth. Perfectly arranged teeth that meet correctly for chewing and biting and that have few pits and cracks or teeth that are widely separated, so that they are relatively self-cleansing, have less tendency to decay.
5. The dental plaque, a tenacious covering on the teeth, and the bacteria in it.
6. The natural resistance of the teeth to acid decalcification.

Science News Letter, January 10, 1948



DRAFTING STENCILS—Made from rigid sheets of plastic, the stencils have extrusions on both sides so that they are never in contact with the paper, providing a perfect inking-edge and minimizing the danger of smudges on the drawing.

ICHTHYOLOGY-AAAS

Fish Found To Possess Acute Sense of Smell

➤ FISH have an acute sense of smell. They can tell the difference between the scents of underwater plants even more sensitively that you can tell the difference between rose and violet perfumes.

At the meeting, T. J. Walker, University of Wisconsin zoologist, told of experiments in which he demonstrated how well fish smell. He arranged an aquarium in which two currents of water could be circulated without becoming mixed. Thus it was possible to introduce simultaneously water in which two different species of waterplants had been washed, and let the fish choose between their respective scents.

The minnows used in the tests were trained to prefer certain plant-scents by rewarding them with food when they swam into their areas. They also were trained to shun others by giving them slight electric shocks when they swam towards them. The majority of the fish used became rather discriminating after a suitable training period.

The water samples in which various aquatic plant species were washed were all scentless to human nostrils, but the little fish knew the difference even when they were greatly diluted.

Mr. Walker suggested that it might be possible to use similarly trained fish to detect traces of contaminating substances in water that seems all right to ordinary examination and chemical tests.

Science News Letter, January 10, 1948

ICHTHYOLOGY-AAAS

Fish Yield of Streams Increased by Fertilizer

➤ DISSOLVING farm fertilizer in a running stream would seem at first blush to be sheer waste. But it is not; bread cast thus upon the waters returns presently in the form of fish.

At the meeting Dr. A. G. Huntsman of the Fisheries Research Board of Canada and the University of Toronto told of the first attempt to increase the fish yield of running streams by use of fertilizer.

The experiment was stimulated by observations that salmon, as well as the water organisms they feed on, were more abundant below a cattle ford on a certain shallow stream in Nova Scotia. In one test, fertilizer was simply scattered on the water; in three others, bags of fertilizer were so placed that their contents would slowly dissolve.

In all cases a notable increase in the number of fish took place. There was a kind of house-that-Jack-built sequence. The fertilizer brought about a heavy increase in the simple water plants known as algae. Insect larvae that feed on algae then increased. Increase in numbers of minnows followed. Finally, the big fish that eat little fish also multiplied.

Science News Letter, January 10, 1948

NUTRITION-AAAS

Iron Absorption Increases With Vegetable Intake

➤ IF YOU have to take iron as a medicine, eat some fruit or fresh vegetables at the same time. That seems to be the practical conclusion pointed to by experiments reported by Prof. Ernest R. Kirch and associates of the University of Illinois. Iron compounds were reduced to the chemical state best fitted for absorption into the system when fruits and vegetables were added to the solution. Next in efficiency in making the iron absorbable were egg white, meat and bread. Milk and egg yolk had little effect.

Science News Letter, January 10, 1948

BIOCHEMISTRY

Asparagus Has Weapon For Fight Against Germs

➤ ASPARAGUS and an anti-war gas chemical are the latest additions to germ fighting weapons, it appears from reports to the journal, *Science*, (Dec. 26).

The anti-TB germ activity of streptomycin and subtilin are stepped up by the anti-war gas chemical, BAL, Drs. Hamilton H. Anderson and Yin-Ch'ang Chin of the University of California Medical School report.

Asparagus contains a substance called quercetin which stops the growth, and therefore the poison production, of the botulinus organisms, Drs. A. A. Andersen and J. A. Berry report from the U. S. Department of Agriculture's Western Regional Research Laboratory at Albany, Calif.

This discovery followed the Agriculture scientists' finding that although asparagus is attacked by many germs that spoil vegetables, it is a poor medium for the growth of the botulinus organism, cause of many a case of fatal poisoning.

Science News Letter, January 10, 1948

IN SCIENCE

AGRICULTURE-AAAS

Milk-Fed Vegetables Have Increased Yield

➤ MILK-FED vegetables can be expected presently to join milk-fed chicken and milk-fed veal on our tables—or maybe replace them, if present meat price trends continue. Drs. V. E. Iverson and L. H. Johnson of Montana State College told the meeting how they had markedly increased the yield of tomatoes and onions by adding buttermilk and skimmilk to the soil, either alone or in combination with commercial fertilizer.

Not only were the yields increased but the soil was left in better condition, both physically and chemically, after the tests.

These experiments point to possible profitable use for low-value dairy products in butter-making areas where marketing buttermilk and skimmilk cannot be handled at a profit. This use of milk products is of course quite different from the "fattening" of pumpkins and squashes by feeding milk into them through a wick. This is done mainly as a "stunt," and in any case could hardly be carried out on a mass-cultivation basis.

Science News Letter, January 10, 1948

BOTANY-AAAS

Experiments Show Camphor Can Be Grown in U. S.

➤ CAMPHOR, necessary in both medicine and industry, can be successfully grown in the United States as far north as Boston, thus rendering America independent of the easily-cut-off source of natural camphor on Formosa Island off the China coast, Prof. Heber W. Youngken and William E. Hassen, Jr., of the Massachusetts College of Pharmacy indicated in a report.

The new potential source of homegrown camphor is not the camphor tree of Asia but a shrubby bush from Africa known as the camphor basil. It grew well and healthily as an annual crop when planted in lightly-limed Massachusetts soil. Dried leaves and flowering tops harvested in late October yielded 2.5% of oil and 2.54% of camphor.

Science News Letter, January 10, 1948

...CE FIELDS

EMBRYOLOGY-AAAS

Cancer and Embryo Growth May Be Related in Fish

➤ SIMILARITY between cancer or tumor growth and the rapid growth of embryos, or unborn young, has often been commented on by scientists. That such growth is not only similar but perhaps related was demonstrated in experiments reported by Dr. Paul S. Galtsoff and Eugenia Galtsoff of the U. S. Fish and Wildlife Service, College Park, Md.

Into the bodies of toadfish, a non-commercial species common in shoal coastal waters, they implanted embryo fish of the same species. Later, when the specimens were killed and dissected, they were found to contain tumors, some of which resembled sarcomas and other malignant growths. The implanted embryos, too, had suffered: they had lost their eyes, their nervous systems had degenerated and general physiological anarchy had set in.

Science News Letter, January 10, 1948

ASTRONOMY-AAAS

Huge Flares of Hot Gas Shoot from Double Star

➤ FLARES of hot gas, similar to the great flaming prominences that rise from the sun but much more enormous, have been discovered to shoot out from the double star, RS Canum Venaticorum.

But strangely enough, these flame-like clouds of gas, instead of bursting forth in all directions, rise only from a small area facing the bright companion star, and possibly on the side directly opposite, Dr. W. A. Hiltner of Yerkes and McDonald Observatory of the Universities of Chicago and Texas stated at the meeting.

The eclipsing binary is composed of two stars, each about twice as massive as the sun. The brighter member of this whirling team has a radius 1.6 times that of the sun; the radius of its companion is 5.4 times as large as the sun's.

When the brighter, smaller star is eclipsed by its companion, for observers on earth it loses 70% of its light. When the same star passes in front of its larger and fainter companion, there is little change in its apparent brightness.

The double star's peculiar actions, however, were discovered when the brighter star passed in front of its companion. The total disappearance of one of the bright lines in the star's spectrum gave away its secret.

By measuring the wavelength of the calcium emission lines of the star's spectrum, Dr. Hiltner stated, we know that this light comes from the large secondary star. If the luminous gas responsible for this calcium line were distributed uniformly over the surface of the large star, its brightness would be changed only 10% as the smaller star passed in front. But the line completely disappears.

The calcium atoms with one electron removed, responsible for this bright line in the star's spectrum, thus must be clustered together in a small area, a region that is completely hidden by the smaller star during an eclipse.

To date, great flaming prominences have been detected on several double stars. This star, however, is much brighter than those previously investigated and thus more could be learned about it.

Science News Letter, January 10, 1948

GENETICS-AAAS

Bikini Radiations Cause Changes in Cotton Plants

➤ ATOM-BOMB radiations struck a small packet of cotton seeds exposed on the deck of one of the Bikini test ships. Last summer, plants grown from those seeds developed abnormalities, internal and external, Dr. Meta S. Brown, cytologist at the Texas Agricultural Experiment Station, told fellow-scientists at the meeting.

Most of the changes from normal were internal, and consisted in dislocations, or even total destruction, of the heredity-bearing chromosomes. This can be very serious, even when it does not show in the first generation grown from the seed; for these changes are passed on into succeeding generations and abnormalities may show up later. And what happened to a cotton seed might happen to a man.

At least one of the plants did show a marked change from the appearance of others from the same lot of seeds. It was stocky, low and bushy, without the long upreaching ends on most of its branches that normal cotton plants of the same strain show.

Science News Letter, January 10, 1948

ASTRONOMY-RADIO

Radar Mirrors Aid Study Of Radio Noises from Sun

See Front Cover

➤ THE sun is attacking the earth with hissing and popping noises. The Bureau of Standards is starting out to investigate these radio noises originating in the sun. Two giant radar mirrors are being set up for this study at the radio propagation laboratory in Sterling, Va. These solar noises are becoming increasingly important with the use of higher and higher frequencies in communication and radar equipment.

These radio waves sent out by the sun may prove useful in many ways. A radio sextant might be built, for instance, that would use solar noise to determine the position of a ship at sea. Ships could thus navigate by the sun despite overcast skies.

Frequencies and intensities of solar radio waves are to be investigated and the actual sources of these waves determined as closely as possible with two giant radar mirrors measuring about 25 feet in diameter. These mirrors, which will be automatically directed toward the sun during the day, as shown on the cover of this week's SCIENCE NEWS LETTER, can capture a large amount of energy from the solar broadcasts.

Radio waves constantly pouring out from the sun, interfere with reception of broadcasts over very-high and ultra-high frequency receivers. They are heard as short "puffs" and "swishes" that last a second or more. Sometimes these "swishes overlap, resulting in an irritating grinding noise which may cause streaking on a television screen and picture jumpiness.

Science News Letter, January 10, 1948

BIOCHEMISTRY-AAAS

Plant Growth Substances Speed Mosquito Hatching

➤ POSSIBILITY that at least some insects are aided by the growth-promoting substances, or hormones, of plants was pointed out by Dr. Albert Abdel-Malek of the Ohio State University. He experimented with one species of mosquito, which passes the winter in the egg stage. He found that a blue-grass infusion encouraged egg hatching. Later, he obtained a similar result with low concentrations of three synthetic growth hormones: naphthalene acetic acid, indole butyric acid and indole acetic acid.

Science News Letter, January 10, 1948

MINERALOGY

Untapped Sources of Oil

Greatest potential source is the ocean bottom. Other inaccessible places may contain oil but the problem is to find it and get it out.

By A. C. MONAHAN

➤ THERE is plenty of oil in the earth's crust, scientists say. The problem is how to find it, and then how to get it out. The greatest untapped source is the 10,000,000 square miles of continental shelf that extends from a few to a few hundreds of miles underwater from the shores of continents and islands.

There is also plenty of unfound oil in dryland areas, they believe. But it is deep down, perhaps a mile or more, below the present known deposits. Or it is beyond the Arctic Circle, buried below accumulated ice and hundreds of feet of frozen earth. And perhaps it is in accessible places but not in the ordinary petroleum traps from which most crude oil is now obtained. To locate this oil, new scientific instruments are needed. Geophysicists are working frantically to develop them.

Geologist Explores for Oil

The petroleum geologist is the number one man in oil exploration. There is no divining rod that will locate petroleum. The first step, after surface surveys, is a wide and intensive study of the underlying structure of the earth in the general type of geological formation favorable to oil formation. In these every bit of geological information must be taken under consideration. Included are rock outcrops on the surface, crust structures within mines if any are in the region, and the logs of every deep well drilled in the general area whether for deep water, minerals or any other purpose.

Geologists now know the crust of the earth from the Arctic to the Antarctic well enough to be able to plot roughly the areas favorable for finding petroleum deposits. They call such regions "petroliferous." These areas now must be closely studied by geologists and geophysicists, the latter using such instruments as the seismograph, gravity meter and the magnetometer.

One noted petroleum geologist estimates that there are 1,000,000,000,000 barrels of oil in the world's continental shelf. He is Wallace E. Pratt, former vice-president of the Standard Oil Company of New Jersey, who has devoted much of his life to the application of geology to the discovery of petroleum. Exploration for this oil has not yet reached the drilling stage, except relatively near shore, but ocean-bed instrument studies are being made in the Bahama seas, some 200 miles off the coast of southern Florida. The scientists are working deep in the water under diving bells.

Many Oil Wells in Ocean

There are, of course, many producing oil wells in the ocean offshore from California, Texas, Louisiana, Venezuela and elsewhere. They are largely in proven areas that extend under the sea from producing field ashore. Three wells have been drilled from 10 to 30 miles out from Louisiana in the Gulf of Mexico, and several others are planned.

Much of the petroleum in continental shelves can never be recovered because of the depth of the water over them and their location, such as in the Arctic ocean. No one has yet figured out the best way to mine the under-ocean oil. At the 10-mile well off Louisiana, the plan used was relatively simple because the water at the site is only 16 feet deep at low tide.

A platform on piles was erected 20 feet above mean high water. This gives protection against high waves. The platform is large enough to hold all drilling equipment, fuel, fresh water and standby units.

One suggestion of how to tap the continental shelf oil is by the use of anchored diving bells, large enough to house a derrick and drilling rig. Underwater pipelines would bring the oil ashore. Another is to use large floating platforms of the type once proposed for mid-ocean landing fields for transatlantic airplanes.

A third suggestion is to tunnel out from the shore through the ocean bed to the oil sands and drill the wells in the tunnel.

It is not expected that there will be any attempts to tap oil supplies deep under the ocean while a plentiful supply can be obtained otherwise. There is much petroliferous area in the world as yet unexplored. Active explorations by instruments and core-drilling are underway in many of them, including Australia, a continent producing no petroleum as yet, Siberia, Alaska and in both the Americas.

Other Sources of Liquid Fuels

There is also the possibility that continental shelf oil may never be needed, particularly if liquid fuels can be obtained cheap enough from coal, oil shale or natural gas. Liquid fuels from vegetation, such as alcohol, may also limit the need for gasoline.

Of more immediate importance than the oil in the continental shelf, of which the United States has a million square miles, is the hidden petroleum in petroliferous areas within the continent. About one-eighth of the petroliferous areas of the world are in America.

They are largely in the interior. One great area extends northwesterly from

DIVING BELL — Engineers with gravity instruments are being lowered in this apparatus off the Florida coast in the Bahama seas. They are studying structures holding oil for the Standard Oil Co. of New Jersey.

BORING UNDERWATER—Ten miles out in the Gulf of Mexico the search for hidden oil goes on. This picture shows the operation of well-boring underwater from a platform by the Magnolia Petroleum Company.

Texas, passing just east of Denver, through the Wyoming and Montana oil fields up to Calgary, Canada. After a break, it goes almost up to adjoin the North Alaska field now being drilled by the Department of the Navy.

Another area extends westward from the present Ohio and West Virginia fields to the Mississippi, covering Lower Michigan. Less promising geological formations exist in Florida, Southwest Alaska, Hudson Bay country and along the Arctic coast of North America. The Uinta Basin, eastern Utah, now under exploration, is expected to yield much oil.

New Exploratory Methods

To the layman any method of determining the deep underground structure of the earth without digging deep shafts or drilling wells seems a mystery. However, scientists are using several. The seismic, gravity and magnetic methods have proved most useful. Now technicians are attempting to employ induction currents and radio.

The seismic method, perhaps the most helpful of those used, employs the seismograph, best known to the public as the device used to detect and record earthquake tremors. In this method, explosives are used near the surface to set up sound waves, some of which go downward deep into the earth. They are reflected back when they hit a dense layer of minerals. The reflections are recorded at several scattered stations; then the location of the layer is determined by mathematics.

In the gravity method, deviations in the direction of the force of gravity caused by dense underlying formations are measured. The magnetic method depends upon the influences of underground structures on a free-swinging magnetic needle. The instrument used is called a magnetometer.

Essentially a magnetic survey is a method of determining the contours of underlying granites and other formations known to scientists as the "crystalline basement." A knowledge of this basement, particularly in areas covered by marine sediments, is of fundamental importance to oil exploratory work. The magnetometer, for detailed work, is ground-based, often trailer-mounted. For general preliminary surveys the same magnetometer which was trailed behind and under airplanes to detect submerged Nazi U-boats is employed. It has been used for greater details than can be obtained with planes, borne by a helicopter.

Radio Seems Promising

Several electrical methods have been tried to locate oil deposits. Now the use of radio seems promising. A government patent, No. 2,426,918, was issued Sept. 3, 1947, to William M. Barret, Shreveport, La., for a method developed by him. He states that he has found earth layers do not quench electromagnetic waves of radio frequency as rapidly as had been assumed, so that he can project them into the ground and receive their echoes.

Another electrical instrument is under development in the New York laboratory of Frank Rieber, an inventor well known for his widely used refraction and reflection seismograph. The instrument will use radio reflections rather than shock waves by man-made explosions as with the seismograph.

Instruments Find Oil Traps

Present exploratory instruments are successful in locating oil in what are known as traps formed in the earth's crust by overlaps and folding of underground strata. But all oil is not in such traps, Mr. Rieber believes. There is oil in traps of a different sort, widely spread in porous layers between other layers. He calls the first a structural trap; the second, a stratigraphic trap. The instrument on which he is working is primarily to discover the oil in these stratigraphic traps by locating porous layers and tracing them to spots where the oil might accumulate.

Present known oil reserves in the United States may become exhausted in from 15 to 30 years, as many believe, but oil men all seem to feel that undiscovered deposits will keep the country supplied for a much longer period than that.

Science News Letter, January 10, 1948

"Chemicity" has to do with processes using jointly chemistry and electricity.

When *eggs* are kept for any considerable period, in cold storage for instance, they are best packed in suitable containers with their big ends up; otherwise the yolk may be displaced.

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Do You Know?

Decay in wood occurs only by the action of fungi or bacteria.

Jet-propulsion of aircraft is most efficient at high speeds; when the flight speed is reduced, the propulsion efficiency of jet engines decreases.

Subjecting unmated *queen bees* to a carbon dioxide gas anesthetic causes them to lay eggs which later hatch into drone bees.

A burning *paper match* produces about 40 times as much light as the so-called grain-of-wheat lamp used by surgeons in exploring body cavities.

There are now more than 100 *soybean processing plants* in America; the soybean is America's fourth largest cash grain crop, following corn, wheat and oats.

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BIOCHEMISTRY-AAAS

Mutations with Chemicals

➤ CANCER-CAUSING chemicals can also cause the sudden evolutionary changes known as mutations, Dr. M. Demerec of the Carnegie Institution of Washington announced at the meeting. This points to the opposite possibility that mutation-causing chemicals may cause cancer, and must therefore be avoided or at least handled with extreme caution.

Dr. Demerec's experimental results support the theory already advanced, that cancer cells behave like strangers in the bodies they afflict because they have actually become strangers through mutational changes. If this is true, he commented, "our chances for finding ways to prevent it are very, very slight."

However, it should be possible to reduce the frequency of cancer by avoiding contact not only with cancer-causing chemicals but with chemicals known to cause mutations, and extensive research for the mutation-causing properties of all sorts of compounds appears to be in order.

Dr. Demerec demonstrated the possibility of chemical production of mutations by exposing the geneticist's favorite animals, fruit-flies, to an exceedingly fine mist or aerosol of a war gas that was never used in war, one of the nitrogen mustards. The bodies of insects are so constructed that air and anything that may be in it comes into direct contact with their sex glands, thereby exposing them to mutation if the appropriate chemical is used. Now he is continuing the experiments, with aerosols of various cancer-causing compounds, as well as other chemicals not yet proven guilty.

Cancer-causing chemicals can change the heredity of animals from cancer-resistant to cancer-susceptible, Dr. L. C. Strong of Yale University reported. Into mice of an inbred strain that normally lost only six-tenths of one per cent of its numbers to cancer he injected the cancer-causing chemical, methylcholanthrene, keeping up the treatment through nine successive generations. After this, nearly two-thirds of the mice of this strain developed cancer, and the tendency had become hereditary.

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NUCLEAR PHYSICS-AAAS

Mesotron May Be Created

➤ WITHIN the next few months, giant high voltage machines should create one of the fundamental particles of matter, the mesotron, which up to now has been seen only rarely as a result of cosmic rays smashing into the upper atmosphere of the earth.

This prediction by Prof. Marcel Schein of the University of Chicago raises hope that the role of this particle, intermediate between electron and proton, will be discovered.

Observations made on America's highest peak, Mt. McKinley, by a mountaineer colleague, Dr. V. Victoreen, allowed Dr. Schein and T. H. Carr of the Navy cosmic ray project to conclude that five giant atom-smashers operating in 1948 have a chance to generate mesotrons artificially. At 18,200 feet the energies of natural mesotrons are between 150 million and 400 million electron volts. Five accelerators—the one already operating at the University of California and those at Columbia, Rochester, Cornell and Harvard Universities to go into service this year—attain such energies.

Just as the neutron unknown a few years earlier was the key that unlocked atomic energy, so the mesotron may explain the mystery of the forces that hold the atom together.

Already three weights of mesotrons are known and physicists expect that other varieties will be found during their searches on this new atomic frontier.

To duplicate, under controlled conditions, what only the harder cosmic rays can do so far, hope was expressed by Dr. Leland J. Haworth, assistant director of Brookhaven National Laboratory on Long Island, N. Y., that there would be constructed two giant accelerators operating at billions instead of mere millions of electron volts. The top energy of these machines would be ten billion electron volts. Plans for a similar machine on the West Coast at Berkeley were announced earlier.

Science News Letter, January 10, 1948

Bubonic plague in humans, which usually is transmitted to them from rats and other rodents by fleas, is called *sylvatic plague* in the animals.

PHARMACOLOGY

Weak-Action Antiseptics

Three mercurial compounds were found ineffective as germ-killers and also poor disinfectants. These tests were carried out on mice.

➤ THE usefulness of three mercurial antiseptics, used by many lay persons to prevent infections in cut fingers and the like, is challenged in a report issued by the *Journal of the American Medical Association,* (Jan. 3).

The compounds are mercurochrome, merthiolate and metaphen.

They are not effective as germicides (germ-killers) nor as antiseptics and they have many shortcomings as disinfectants, report Dr. Harry E. Morton of the University of Pennsylvania, Dr. Leon L. North, Jr., of the Philadelphia General Hospital, and Frank B. Engley, Jr., of Camp Detrick, Md.

Their report is based on studies made at the University of Pennsylvania aided by a grant from the American Medical Association.

Tests were made with samples of the compounds purchased over the counter from various drug stores. Cultures of virulent hemolytic streptococci were treated with these compounds so that the germs were exposed to the action of the compounds for 10 and 15 minutes. Then the germs were injected into the peritoneum (the membrane lining the belly walls) of mice. The mice usually died and hemolytic streptococci could be isolated from their hearts' blood.

This showed that the chemicals did not kill the germs and did not keep them from being infectious. The compounds tested do check the growth of the germs, but this is not enough, the experiments show, to keep them from causing infection. For that, the germs must be killed.

The question as to whether a germ-checking compound is effective for use on a cut or wound to prevent infection is, the scientists state, beyond the scope of their report. But they point out that another scientist has reported that germs checked only by mercurial compounds are still capable of causing local infection, such as skin abscesses, when introduced into the skin.

The three compounds tested, they also point out, have been reported by other scientists to be more poisonous to embryonic tissue cells and to white blood cells than to bacterial cells.

Germs other than the hemolytic streptococci tested by the Philadelphia scientists might be affected differently by the mercurial compounds, Dr. Austin Smith, secretary of the A. M. A. council on pharmacy and chemistry, points out.

Infection of animals by influenza virus can be prevented by treating the virus with some of these compounds, it has been reported, and they have also been reported capable of inactivating the poliomyelitis virus.

Those who argue in favor of the mercurial compounds should, he states, "proceed seriously and diligently" to the task of exploring, proving and defining the field of usefulness of the compounds. The A. M. A. council is ready to give them an opportunity to meet the challenge, but, Dr. Smith warns, it is a field "in which wishful thinking is dangerous."

Science News Letter, January 10, 1948

ASTRONOMY

Find Many Gaseous Clouds In Interstellar Space

➤ MANY small gaseous clouds fly around in space against a background of larger and deeper clouds that seem to move along with the stars of our stellar system. Yet these enormous clouds do not share the motions of the individual stars, Dr. Walter S. Adams, director emeritus of Mount Wilson Observatory of the Carnegie Institution of Washington, stated in giving the Henry Norris Russell lecture before the American Astronomical Society meeting in Columbus, Ohio.

These gaseous clouds are made up of such elements as potassium, sodium, iron, calcium, ionized calcium and titanium and others. In all, astronomers have found 26 spectral lines that are added to a star's spectrum by material in space between the earth and the stars.

These interstellar gases have been identified by studying the spectra of such hot stars as Rigel in the constellation of Orion. The stars were chosen because they have relatively simple spectra.

In size the clouds range from one that covers a large portion of the constellation of Orion to others that do little more than cover a wide double-star system. As many as four or five separate clouds are occasionally distinguished in the path of light from a not-too-distant star.

Most of the clouds move quite slowly, but a few between us and distant stars travel with a speed as high as 62 miles per second.

Science News Letter, January 10, 1948

ZOOLOGY

Mother Whale's Milk Found To Be Rich in Vitamin C

➤ YOUNG whales get concentrated vitamin in their mothers' milk, it appears from analyses in the British science journal *Nature* (Sept. 27). Prof. Michael Begg of Marischal College, Aberdeen, reports that in a small quantity of milk from the main duct of the mammary gland of a captured Antarctic fin whale the rickets-preventing ascorbic acid (vitamin C) had nearly double the concentration of the same vitamin in cow's milk at its best. It was close to the best assay for vitamin C in human milk.

Science News Letter, January 10, 1948

Here's an eye-opener for your weather eye!

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By BENARTHUR C. HAYNES, Chief, Observation Section, U. S. Weather Bureau

Mr. Haynes has written a basic book on meteorology for which there has long been a crying need. Here, in simple language, is a practical volume which gives detailed instructions on how to use weather instruments, how to interpret what is seen, how to make accurate reports, how to set up an observation station. A section of the book is devoted to directions for setting up a workshop, with diagrams showing equipment you can easily make yourself.

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ECOLOGY

NATURE RAMBLINGS

by Frank Thone

Bird-Borne Seeds

➤ UNTIL recently, earthbound man could only dream of flight, longingly watch the birds—and stay right there on the ground. Yet for ages many plants, though blind, unconscious, unknowing, have borrowed birds' wings for their seeds.

Evidences of these borrowed flights are so common all about us that as a rule we pay no attention to them. Because the survivors of such voyages sprout in every fallow field, stand thick in every fence-row, a veteran naturalist, W. L. McAtee of the U. S. Fish and Wildlife Service, has summed up the situation in a study presented by the *American Midland Naturalist.*

Birds that eat seeds as food, in particular weed seed, are seldom active agents in disseminating those particular species, Mr. McAtee believes. The seeds are ground up in their gizzards, digested, and that is the end of them.

Jays, woodpeckers and other birds that carry off acorns and other large seeds, however, often unwittingly plant them. They may drop them in flight, or after they have hidden them they may either forget about them or die and leave them unused, to sprout in the spring.

Intermediate between these two classes one might notice a group of birds that often dig conifer seeds out of their cones. Included here would be crossbeaks, siskin, grosbeaks and several other members of the finch family. The seeds they swallow do not survive; but in their diggings and pryings they often drop some seeds, which then swirl down the wind on their own wings. The birds here are not carriers, but launchers only.

Birds that eat seeds covered with more or less palatable pulp are perhaps the most effective agents of distribution. Here the pulp alone, as a rule, serves as food; the seed passes through the digestive tract unharmed and is dropped under the bird's perching-place. That is why fence-rows, stone walls and similar places are apt to be marked by rows of red cedar trees, and to be covered with growths of such berry-fruited scramblers and vines as Virginia creeper, wild grape, poison ivy, moonseed, false bittersweet and dewberries.

Science News Letter, January 10, 1948

Interested in Differential Thermal Analyses?*

Speedomax records thermal reactions in six clay samples during one furnace heat; thereby saves the scientist's time. It also permits quick, accurate analyses of results, because six records are on one chart.

Micromax Program Controller, Duration-Adjusting Type, controls furnace temperature regardless of changes in line voltage or ambient temperature.

For details, consult an L&N engineer.

* *Kulp, J. L., Kerr, P. F., Science, Vol. 105, p. 413, 1947.*

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MEDICINE

Cancer Cure from Vitamin?

➤ IS A cancer cure coming from a vitamin? It is too soon to tell but signs begin to point that way.

Latest of these signs appears in a report from a six-man research team headed by Dr. Sidney Farber of Children's Hospital, Boston, to the journal, *Science* (Dec. 19).

These doctors have in the past year treated well over 150 patients, suffering from many kinds of cancers, Hodgkin's disease and leukemia, with two vitamin chemicals. The chemicals are difolic acid and trifolic acid, known also as diopterin and teropterin. They are closely related to folic acid, one of the new vitamins which has been useful in treating certain kinds of anemia.

The patients were all in the last hopeless stages and more than a score have died. Those still living feel better, have less pain, eat better and have more energy.

Some of this improvement may be psychological, the result of knowing a new treatment was being used. Some is believed due to the vitamins.

But the vitamin treatment is "definitely not a cure for cancer at this time," Dr. Farber stated.

The vitamin chemicals used cannot be bought at the drug store and they should not be used in routine treatment of cancer patients, Dr. Farber and co-workers agree.

They are safe to use in that they do not have any poisonous effects. Most of the report is on the tests for possible bad effects and on the doses to be used in experimental treatment with the vitamins. They are given by injection into the muscles though they can be injected into the veins or given by mouth.

The two vitamins, while not yet a cure, have "opened a door" beyond which may wait the vitamin or other chemical or combination of them that will be a cure for cancer. Within the next six months or a year, the picture may change greatly and scientists may be trying other, better cancer-fighting chemicals found by following the lead of this work with the folic acids.

The Boston doctors were the first to use the folic acids in treatment of human cancer patients, though other doctors have begun using them also on an experimental basis. The Boston group is still using trifolic acid and difolic acid but they are also investigating other, related chemicals. They have found a "very interesting lead" which is taking them far beyond the work now reported.

Dr. Farber's associates in the studies, at Harvard Medical School, Peter Bent Brigham Hospital and New England Deaconess Hospital, have been Drs. James W. Hawkins, J. Hartwell Harrison, E. Converse Peirce, 2nd, Gilbert G. Lenz and the late Dr. Elliott C. Cutler.

Science News Letter, January 10, 1948

Books of the Week

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ALSOS — Samuel A. Goudsmit — *Schuman,* 259 p., $3.50. The startling story of the special scientific intelligence mission to discover for the U. S. Army what progress German scientists had made toward war uses of nuclear fission.

AMERICAN PHARMACY—Edited by R. A. Lyman—*Lippincott,* 379 p., illus., $7.00. This book supplements Vol. I; it contains detailed information on advanced pharmacy, including medical and surgical supplies and a chapter each on dental supplies and animal health pharmacy.

FISH PONDS FOR THE FARM—Frank C. Edminster—*Scribners,* 114 p., illus., $3.50. The Chief of the Northeast Regional Biology Division, U. S. Conservation Service, describes design, construction, stocking, and management of the fish pond for productive purposes.

HIGHER EDUCATION FOR AMERICAN DEMOCRACY: Vol. I—Establishing the Goals —A Report of the President's Commission on Higher Education—*Govt. Printing,* 103 p., paper, 40 cents.

HIGHER EDUCATION FOR AMERICAN DEMOCRACY: Vol. II—Equalizing and Expanding Individual Opportunity—A Report of the President's Commission on Higher Education—*Govt. Printing,* 69 p., paper, 35 cents.

INDIAN SKELETAL MATERIAL FROM THE CENTRAL COAST OF PERU—Marshall T. Newman, with a synopsis of the archaeology by Gordon R. Willey—*Peabody Museum of American Archaeology and Ethnology,* Vol. XXVII, No. 4, 71 p., plates unpaged, illus., paper, $2.50.

JANE'S FIGHTING SHIPS: 1946-47—*Macmillan,* 471 p., illus., $20.00. The latest edition of this book of naval sea craft contains almost 600 new illustrations, with appropriate textual revisions.

LOOK AT AMERICA: THE MIDWEST—Editors of Look, in collaboration with Louis Bromfield—*Houghton, Mifflin,* 392 p., illus., $5.00. Excellent photographs, maps, and explanatory text are included in this pictorial study of the Midwest, describing its numerous points of scenic, historical, cultural, and industrial interest.

RADAR AIDS TO NAVIGATION—John S. Hall —*McGraw-Hill,* 389 p., illus., $5.00. This second volume of the Massachusetts Institute of Technology's Radiation Laboratory Series discusses radar in relation to problems of pilotage and navigation.

SCIENCE AND PUBLIC POLICY: Vol. 2—The Federal Research Program—*Govt. Printing,* 318 p., paper, 55 cents. Presents for the American people an insight into the diverse scientific research programs initiated by the U. S. Government in the physical and biological sciences.

SCIENCE AND PUBLIC POLICY: Vol. 5—The Nation's Medical Research—*Govt. Printing,* 118 p., paper, 25 cents. Research activities of the Federal Government in medicine and related scientific fields are described in this final report of the series, which recommends that national expenditures in this direction be tripled at an early date.

TREES AND TOADSTOOLS—M. C. Rayner—*Rodale,* 91 p., illus., $2.50. An interesting account of the symbiotic life patterns existing between certain types of fungi and the trees beneath which they thrive.

UNDERSTANDING OUR ENVIRONMENT—Franklin B. Carroll—*Winston,* 313 p., illus., $2.00. The first of a series of elementary general science and biology books, dealing with all phases of natural science.

UNDERSTANDING OUR WORLD — Franklin B. Carroll—*Winston,* 412 p., illus., $2.24. Explorations into science on a more comprehensive and inclusive level than that considered in the previous volume.

UNDERSTANDING THE UNIVERSE—Franklin B. Carroll—*Winston,* 550 p., illus., $2.48. A further inquiry into the nature of the world, and the earth's place in it.

WOMEN'S PREFERENCES AMONG SELECTED TEXTILE PRODUCTS—Bur. of Agric. Econ., Dept. of Agric. Misc. Publ. 641—*Govt. Printing,* 124 p., paper, 25 cents.

THE WORKS OF THE MIND—R. B. Heywood—*Univ. of Chicago,* 246 p., $4.00. First delivered as a series of lectures at the University of Chicago, these chapters discuss the creative processes through which enduring results may be achieved in the fields of the fine arts, government, education, scholarship and creative thought.

Science News Letter, January 10, 1948

ASTRONOMY

Galaxies Have Rosy Tint

➤ DISTANT galaxies, systems of billions of stars like the Milky Way system of which the earth is a part, have been found to be distinctly redder than nearby ones. This reddening makes the galaxies appear fainter to the photographic plate than they would otherwise be. It may mean that the 200-inch telescope on Mount Palomar will not penetrate space so far as was estimated.

The cause of the reddening is not known. This reddening is over and above the well-known red shift of the spectrum lines due to the apparent expansion of the universe and is several times greater than would be expected from the red-shift alone.

This rosy tinting of distant galaxies is important as the theory of the expanding universe is based on estimates made from the apparent magnitudes of distant galaxies. If these galaxies get progressively dimmer than normal from the distance increase alone, then the magnitudes and resulting distances must be drastically revised.

The reddening of distant star systems was found through use of a dry-ice refrigerated photoelectric photometer placed at the focus of the 100-inch telescope on Mount Wilson. The observations were carried on by Dr. Joel Stebbins and Dr. A. E. Whitford, both of Washburn Observatory, University of Wisconsin. Drs. E. P. Hubble and Walter Baade, both of Mount Wilson Observatory, advised them and helped with the work.

The colors of the galaxies, the Washburn Observatory astronomers reported at the American Astronomical Society meeting in Columbus, Ohio, were determined by measuring the relative brightnesses through yellow and blue filters. The new reddening is proportional to the shift of the spectrum lines, and has been followed for the nearest examples, comparative neighbors of the sun less than a million light-years away, to a member of the cluster of galaxies in the constellation of Bootes, two hundred million light-years away.

This reddening, small though it is, is very hard to explain. One tentative explanation is that the huge reaches of intergalactic space contain dust and gas like that in the galaxy. But the required quantity of "intergalactic dust and gas" which would account for the observed reddening would increase the total calculated amount of matter in the universe by as much as a thousand times. This might require an actual reduction in the theoretical size of the universe.

Science News Letter, January 10, 1948

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TELEPHONE EARPIECE ATTACHMENT, which fits over the earpiece but has no electrical connections with the telephone, enables incoming voices to be heard through the radio loud speaker. It is a midget inductor unit designed to operate with the standard radio receiver or any type of disk-wire-film-cylinder electric recorder.

Science News Letter, January 10, 1948

TREE-MARKING device for foresters, to indicate trees for cutting by a paint spray, is quickly converted into a torch for starting back-fires in case of a forest fire. Conversion is made by removing the paint nozzle, screwing on a back-firing attachment and filling the container with a 50-50 mixture of kerosene and gasoline.

Science News Letter, January 10, 1948

MECHANICS' level measures the degree of slope of a bridge strut or a roof rafter. Made of aluminum and usable on all four surfaces, the 16-inch level has a central dial marked in degrees and a needle that remains vertical, thus indicating the slope. It has two horizontal and two vertical spirit vials.

Science News Letter, January 10, 1948

KNIFE SHARPENER, shown in the picture, has plastic wheels that will not injure a kitchen table surface. The center part of the spool-like device is a grinding stone between which and the plastic wheel the knife is inserted. A pull-push motion of the knife rotates the spool, putting a keen edge on the blade.

Science News Letter, January 10, 1948

LIVE LOBSTER PACKAGE permits them to be flown from coast to coast in perfect condition. It is an insulated boxwood carton which controls temperature of the lobsters in transit, and a bag-type plastic liner to retain moisture of the seaweed in which the crustaceans are packed.

Science News Letter, January 10, 1948

TRUCK TIRE EXPANDER, just patented, consists of a light-weight lever carrying a sleeve which is worked forward by means of a handle and a ratchet device. Lever and sleeve have downward projecting, hook-like, tire-engaging arms which spread the tire as the sleeve advances.

Science News Letter, January 10, 1948

ELECTRIC FISH SCREEN unit, a portable type suitable for the average farm pond, consists of a new type electronic generator used in conjunction with a free-swinging electrode system. The generator produces a series of mild, harmless underwater shock waves which keep fish away from outlets.

Science News Letter, January 10, 1948

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